

## Soft, robotic muscles 1,000 times stronger

30th November, 2017



Scientists from two of the USA's elite universities have pioneered a new method of creating artificial muscles. The scientists have dubbed their discovery as a "soft robot". It is a 2.6-gram "muscle" that looks like a small bag with many water-filled compartments. It has been given amazing strength by supporting it with an

origami-inspired structural framework. This allows the artificial muscle to lift an object that is 1,000 times its own weight. The New Scientist website said this weight-to-strength ratio is the equivalent of a newborn baby lifting a large 4WD car. The ground-breaking discovery could greatly benefit many areas of science, medicine, robotics and engineering.

The scientists are from the Massachusetts Institute of Technology and Harvard University. They are experts in the field of soft robotics. They said their new soft robot muscle can be made in just 10 minutes and costs less than one dollar. Researcher, professor Robert Wood, hopes to create "softer" robots that are more similar to humans. He said: "Humans are normally soft and brittle compared to the big industrial robots that you might find on an assembly line. The next step is to take this system and develop it into a fully functional robot." Dr Daniela Rus explained that the robots could be like the human hand. They could be strong enough to grip any object firmly, while being soft and gentle.

Sources: [newscientist.com](http://newscientist.com) / [theverge.com](http://theverge.com) / [news-medical.net](http://news-medical.net)

## Writing

It will be great to have robots that look like humans. Discuss.

## Chat

Talk about these words from the article.

elite / universities / pioneer / muscle / strength / origami / equivalent / newborn baby scientists / experts / robotics / similar / humans / assembly line / functional / gentle

## True / False

- Scientists from two universities made a robotic muscle. T / F
- The new robotic muscle weighs about 2.6kg. T / F
- The scientists took inspiration from origami to create the muscle. T / F
- The strength of the muscle is like a baby lifting a 4-wheel drive car. T / F
- The scientists are experts in the field of muscles and bodybuilding. T / F
- The new muscle costs less than a dollar to make. T / F
- The scientists hope to create harder robots, like industrial robots. T / F
- The scientists say robots will never be like the human hand. T / F

## Synonym Match

(The words in **bold** are from the news article.)

- |                           |                      |
|---------------------------|----------------------|
| 1. <b>elite</b>           | a. specialists       |
| 2. <b>artificial</b>      | b. pioneering        |
| 3. <b>compartments</b>    | c. area              |
| 4. <b>object</b>          | d. sections          |
| 5. <b>ground-breaking</b> | e. grasp             |
| 6. <b>field</b>           | f. crème de la crème |
| 7. <b>experts</b>         | g. breakable         |
| 8. <b>brittle</b>         | h. manufacturing     |
| 9. <b>industrial</b>      | i. synthetic         |
| 10. <b>grip</b>           | j. thing             |

## Discussion – Student A

- What do you think about what you read?
- What do you know about soft robotics?
- What would robots as soft as humans be like?
- How will robots help us in the future?
- Should robots look exactly like humans?
- Would you accept an artificial robot transplant?
- How dangerous could a super-strong robot be?
- What questions would you like to ask the scientists?

## Phrase Match

- |   |                      |
|---|----------------------|
| 1. two of the USA's elite                     | a. brittle           |
| 2. a new method of creating artificial        | b. as a "soft robot" |
| 3. The scientists have dubbed their discovery | c. ratio             |
| 4. lift an object that is 1,000 times         | d. functional robot  |
| 5. weight-to-strength                         | e. universities      |
| 6. They are experts in the field              | f. line              |
| 7. soft and                                   | g. muscles           |
| 8. on an assembly                             | h. firmly            |
| 9. develop it into a fully                    | i. its own weight    |
| 10. strong enough to grip any object          | j. of soft robotics  |

## Discussion – Student B

- Why are elite universities elite?
- What do you think of artificial muscles?
- What do you think of your muscles?
- What do you think of the artificial muscle?
- What do you know about origami?
- What would life be like if your were 1,000 times stronger?
- How ground-breaking is this discovery?
- What might this discovery change in the world?

## Spelling

- two of the USA's eltei universities
- erpneoedi a new method
- dubbed their vrydscieo as a "soft robot"
- an origami-inspired lscrttuaru framework
- iifcaltair muscle
- medicine, srocitob and engineering
- They are eexstpr in the field of soft robotics
- soft and titlebr
- the big iunastrild robots
- on an sebylmsa line
- a fully olnciautfn robot
- grip any octjeb firmly

### Answers – Synonym Match

1. f	2. i	3. d	4. j	5. b
6. c	7. a	8. g	9. h	10. e

## Role Play

### Role A – Medicine

You think medicine is the thing robots can help most. Tell the others three reasons why. Tell them why robots won't help their things as much. Also, tell the others which of these robots will help least (and why): transport, education or our retirement.

### Role B – Transport

You think transport is the thing robots can help most. Tell the others three reasons why. Tell them why robots won't help their things as much. Also, tell the others which of these robots will help least (and why): medicine, education or our retirement.

### Role C – Education

You think education is the thing robots can help most. Tell the others three reasons why. Tell them why robots won't help their things as much. Also, tell the others which of these robots will help least (and why): transport, medicine or our retirement.

### Role D – Our Retirement

You think our retirement is the thing robots can help most. Tell the others three reasons why. Tell them why robots won't help their things as much. Also, tell the others which of these robots will help least (and why): transport, education or medicine.

## Speaking – Robotics

Rank these with your partner. Put the things robots could help most at the top. Change partners often and share your rankings.

- |                  |             |
|------------------|-------------|
| • teaching       | • science   |
| • entertainment  | • medicine  |
| • our retirement | • sports    |
| • construction   | • transport |

### Answers – True False

a	T	b	F	c	T	d	T	e	F	f	T	g	F	h	F
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Answers to Phrase Match and Spelling are in the text.